

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Original) A method comprising:

accessing a first multi-dimensional graphical representation that describes the appearance of a plurality of points of an object from a plurality of viewing directions, the appearance varying from point to point and viewing direction to viewing direction;

creating a second graphical representation that approximates the first graphical representation and that includes at least one expression having a fewer dimensions than the first multi-dimensional graphical representation by decomposing the first multi-dimensional graphical representation into the second graphical representation, the decomposing including selectively representing information from the first graphical representation.
2. (Original) The method of claim 1, further comprising expressing the first graphical representation as a matrix, and wherein creating the second graphical representation includes using singular value decomposition to decompose the first multi-dimensional graphical representation into a first vector multiplying a second vector.
3. (Original) The method of claim 1, wherein creating by decomposing includes selectively representing information from the first graphical representation that is most important to describe the appearance of the object and neglecting redundant

information from the first graphical representation that is less important to describe the appearance of the object.

4. (Original) The method of claim 1, further comprising:

accessing a third multi-dimensional graphical representation that describes the appearance of a second plurality of points of the object from a plurality of viewing directions, the second plurality of points including the first plurality of points, and the appearance varying from point to point and viewing direction to viewing direction; and

partitioning the third multi-dimensional graphical representation into a plurality of smaller multi-dimensional graphical representations each associated with a primitive of a polygonal representation of the geometry of the object, the plurality of smaller multi-dimensional graphical representations including the first multi-dimensional graphical representation.

5. (Original) A method comprising:

accessing a first graphical representation that describes the appearance of a plurality of points on an object;

creating a second graphical representation based on the first graphical representation, the second graphical representation containing less redundant descriptive information than the first graphical representation, and the second graphical representation containing a plurality of portions that are capable of being concurrently combined to display the plurality of points of the object with an appearance associated with a particular viewing direction.

6. (Original) The method of claim 5, wherein the first graphical representation describes the appearance of a plurality of points of an object from a plurality of viewing directions, the appearance varying from point to point and viewing direction to viewing direction.
7. (Original) The method of claim 5, wherein creating includes creating a second graphical representation that includes a plurality of portions capable of being expressed as matrices, the method further comprising expressing the plurality of portions as matrices.
8. (Original) The method of claim 5, further comprising:

storing the second graphical representation;

receiving a request on a network for the second graphical representation;

transmitting the second graphical representation on the network after receiving the request.
9. (Original) The method of claim 5, wherein creating includes creating a second graphical representation that includes a plurality of portions that can be combined using multitexturing hardware that allows multiple textures to be concurrently applied to a primitive in a single rendering pass.
10. (Original) The method of claim 5, wherein creating includes creating a second graphical representation that includes a plurality of portions that are capable of being concurrently combined without decompressing the plurality of portions.

11. (Original) The method of claim 5, further comprising:

accessing a third graphical representation that describes the appearance of a second plurality of points of the object from a plurality of viewing directions, the second plurality of points including the first plurality of points, and the appearance varying from point to point and viewing direction to viewing direction; and

partitioning the third graphical representation into a plurality of smaller graphical representations each associated with at least one primitive of a polygonal representation of the geometry of the object, the plurality of smaller multi-dimensional graphical representations including the first multi-dimensional graphical representation.

12. (Original) A machine-readable medium having stored thereon data representing sequences of instructions that when executed cause a machine to perform operations comprising:

accessing a first graphical representation that describes the appearance of a plurality of points on an object;

creating a second graphical representation based on the first graphical representation, the second graphical representation containing less redundant descriptive information than the first graphical representation, and the second graphical representation containing a plurality of portions that are capable of being concurrently combined to display the plurality of points of the object with an appearance associated with a particular viewing direction.

13. (Original) The machine-readable medium of claim 12, wherein the instructions for accessing the first graphical representation further comprise

instructions causing the machine to perform operations comprising accessing a first graphical representation that describes the appearance of a plurality of points of an object from a plurality of viewing directions, the appearance varying from point to point and viewing direction to viewing direction.

14. (Original) The machine-readable medium of claim 12, wherein the instructions for creating further comprise instructions causing the machine to perform operations comprising creating a second graphical representation that includes a plurality of portions capable of being expressed as matrices.
15. (Original) The machine-readable medium of claim 12, wherein the instructions for creating further comprise instructions causing the machine to perform operations comprising creating a second graphical representation that includes a plurality of portions that can be combined using multitexturing hardware that allows multiple textures to be concurrently applied to a primitive in a single rendering pass.
16. (Original) The machine-readable medium of claim 12, wherein the instructions for creating further comprise instructions causing the machine to perform operations comprising creating a second graphical representation that includes a plurality of portions that are capable of being concurrently combined without decompressing the plurality of portions.
17. (Currently Amended) The [[machine readable]] machine-readable medium of claim 12, wherein the instructions further comprise instructions causing the machine to perform operations comprising:

accessing a third graphical representation that describes the appearance of a second plurality of points of the object from a plurality of viewing directions, the

second plurality of points including the first plurality of points, and the appearance varying from point to point and viewing direction to viewing direction; and

partitioning the third graphical representation into a plurality of smaller graphical representations each associated with at least one primitive of a polygonal representation of the geometry of the object, the plurality of smaller multi-dimensional graphical representations including the first multi-dimensional graphical representation.

18. (Original) A method comprising:

accessing image-based data for an object that describes the appearance of the object from a plurality of viewing directions;

dividing the image-based data into a plurality of smaller portions associated with regions on the object;

standardizing each of the plurality of smaller portions;

creating a plurality of approximate graphical representations that approximate the plurality of standardized portions by selectively representing certain non-redundant information from each of the plurality of standardized portions; and

storing each of the plurality of approximate graphical representations.

19. (Original) The method of claim 18:

wherein dividing the image-based data includes partitioning the image-based data into a plurality of subsets of image-based data, each subset of image-based data describing the appearance of a primitive-defined region of the object for a

particular viewing direction, each subset having a higher degree of spatial coherency than the set of image-based data;

wherein standardizing includes normalizing the size of each of the plurality of subsets of image-based data to a predetermined size, normalizing the shape of each of the plurality of subsets of image-based data to a predetermined shape, and using the plurality of subsets of image-based data to compute a resampled plurality of subsets of image-based data that correspond to predetermined standardized viewing directions; and

wherein creating a plurality of approximate graphical representations includes creating for each primitive-defined region a first data structure that is independent of the viewing direction and a second data structure that includes a plurality of portions that each correspond to a different viewing direction.

20. (Original) The method of claim 18, further comprising:

acquiring geometry data for an object that describes the geometric extents of the surface of the object;

converting the geometry data into a geometric representation of the geometry of the object; and

acquiring image-based data that describes the appearance of the surface of the object from a plurality of viewing directions.

21. (Original) The method of claim 18, further comprising:

receiving a request for graphical content associated with the object from another computer system;

transmitting a plurality of approximate graphical representations to the other computer system; and

transmitting geometry data for the object to the other computer system.

22. (Currently Amended) A data structure stored on a machine-readable medium comprising at least a first portion and a second portion, the second portion including a second plurality of view-dependent subportions including a first view-dependent subportion that corresponds to a first viewing direction and a second view-dependent subportion that corresponds to a second viewing direction, wherein the first portion and the first view-dependent subportion are combinable using multitexturing hardware that allows multiple textures to be concurrently applied to a primitive in a single rendering pass to display a plurality of points of an object with a first appearance corresponding to a first viewing direction, and wherein the first portion and the second view-dependent subportion are combinable using the multitexturing hardware to display the plurality of points of the object with a second appearance corresponding to a second viewing direction.
23. (Original) The data structure of claim 22, wherein the data structure is derived from a plurality of images acquired for the object by selectively representing information from the plurality of images that is important to describe the appearance of the object and selectively removing information from the plurality of images that is redundant.
24. (Original) The data structure of claim 22, wherein the first portion and the first view-dependent subportion are combinable without decompression using the multitexturing hardware.

25. (Original) The data structure of claim 22, wherein the first portion and the second portion are created by decompressing a corresponding compressed first portion and a corresponding compressed second portion of another data structure.

Claims 26-30 (Cancelled)

31. (New) A method comprising:
- accessing multi-dimensional radiance data for an object, the multi-dimensional radiance data describing radiance of the object from different viewing directions;
- partitioning the multi-dimensional radiance data into smaller portions corresponding to triangles of a triangular mesh representation of the object;
- generating an alternate representation of the object by decomposing the partitioned multi-dimensional radiance data into a set of discrete functions that have lower dimension than the original multi-dimensional radiance data; and
- storing the alternate representation of the object.
32. (New) The method of claim 31, wherein said generating the alternate representation comprises decomposing the partitioned multi-dimensional radiance data into a sum of products of two-dimensional functions.
33. (New) The method of claim 31, wherein said generating the alternate representation comprises using singular value decomposition.
34. (New) The method of claim 31, further comprising providing at least a portion of the alternate representation to texture mapping hardware.